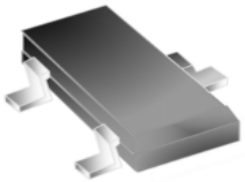
## Description

The XE23T712B transient voltage suppressor (TVS) diode is designed for asymmetrical (12V to -7V) protection in multi-point data transmission standard RS-485 applications. The XE23T712B may be used to protect devices from transient voltages resulting from electrostatic discharge (ESD), electrical fast transients (FET), and lightning.

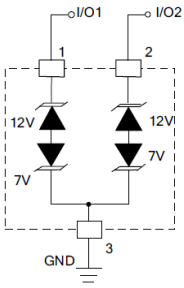
The XE23T712B features 400 Watts (tp=8/20μs) of power handling capability to accommodate the higher transient voltage levels which may be expected in extended common mode applications. This provides higher equipment reliability and eliminates the " guess work " required when using zener diodes that are not rated to handle such transient conditions.

The integrated design aids in reducing voltage over-shoot associated with trace inductance. The low clamping voltage of the XE23T712B minimizes the stress on the protected transceiver. The SOT-23 package allows flexibility in the design of "crowed" circuit boards.

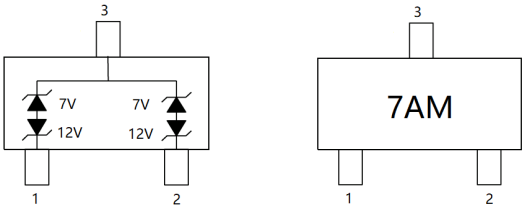
http//:www.xihangsemi.com



**SOT-23**




**Circuit Diagram**




**Marking（Top View）**

## Features

- 400 watts peak pulse power (tp=8/20μs)
- Protects two +12V to -7V lines
- Transient protection for asymmetrical data lines to
  IEC61000-4-2 (ESD) ±15kV (air),
  ±8kV (contact)
  IEC61000-4-5 (Lighting) 12A (8/20us)
  IEC61000-4-4(EFT)40A(5/50ns)
- Low leakage current
- Low clamping voltage
- Solid-state silicon-avalanche technology
- RoHS compliant

## Order Information

| Device | Package | Shipping |
|---|---|---|
| XE23T712B | SOT-23 | 3000/Tape&Reel |

## Applications

- Protection of RS-485 transceivers with extended common-mode range
- Networks
- Security systems
- Automatic Teller Machines
- HFC systems

## Absolute Maximum Rating

| Rating | Symbol | Value | Units |
|---|---|---|---|
| Peak Pulse Power ( $t_P$ = 8/20μS ) | $P_{PK}$ | 400 | W |
| Peak Pulse Currentr ( $t_P$ = 8/20μS ) | $I_{pp}$ | 12 | A |
| ESD according to IEC61000-4-2 air discharge | $V_{ESD}$ | ±8 | kV |
| ESD according to IEC61000-4-2 contact discharge | | ±15 | kV |
| Lead Soldering Temperature | $T_L$ | 260 (10 sec) | ℃ |
| Operating Temperature | $T_{OP}$ | -55 to +125 | ℃ |
| Storage Temperature | $T_{STG}$ | -55 to +150 | ℃ |

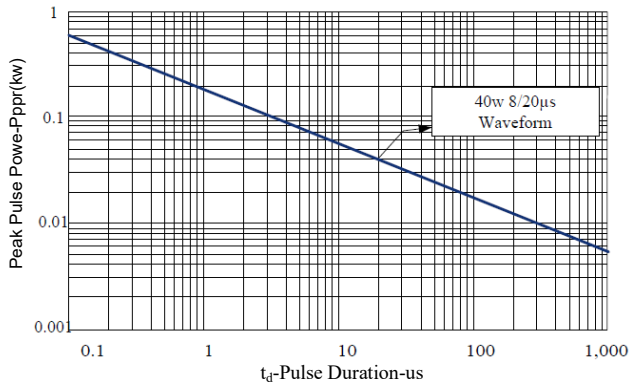
## Electrical Characteristics (Ta=25℃, unless otherwise noted)

| Parameter | Symbol | Conditions | Pin1、Pin2 to Pin3 (12V TVS) | | | Pin3 to Pin1、Pin2 （7V TVS） | | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| Reverse Stand-off Voltage | $V_{RWM}$ | | | | 12 | | | 7 | V |
| Reverse Leakage Current | $I_R$ | $V_R$ =$V_{RWM}$ | | | 1.0 | | | 1.0 | uA |
| Reverse Breakdown Voltage | $V_{BR}$ | $I_T$=1mA | 13.3 | | | 7.5 | | | V |
| Clamping Voltage | $V_C$ | $I_{PP}$=5A $t_P$ = 8/20μs | | 20 | 23 | | 12 | 15 | V |
| Clamping Voltage | $V_C$ | $I_{PP}$=12A $t_P$ = 8/20μs | | 23 | 26 | | 15 | 18 | V |
| Junction Capacitance | $C_j$ | $V_R$=0V f = 1MHz | | | 75 | | | 75 | pF |
| Junction Capacitance | $C_j$ | $V_R$= $V_{RWM}$ f = 1MHz | | 45 | | | 45 | | pF |

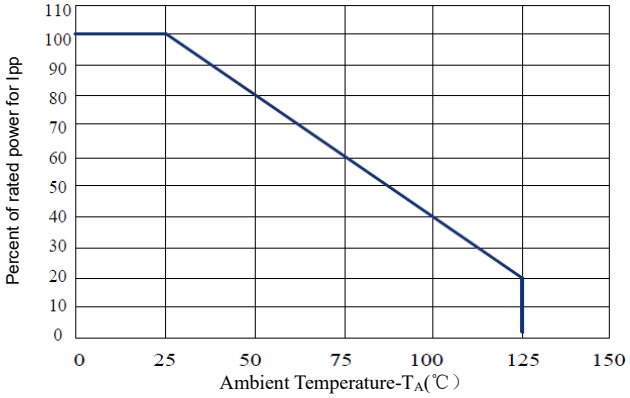
Notes:

1) Non-repetitive current pulse, according to IEC61000-4-5.

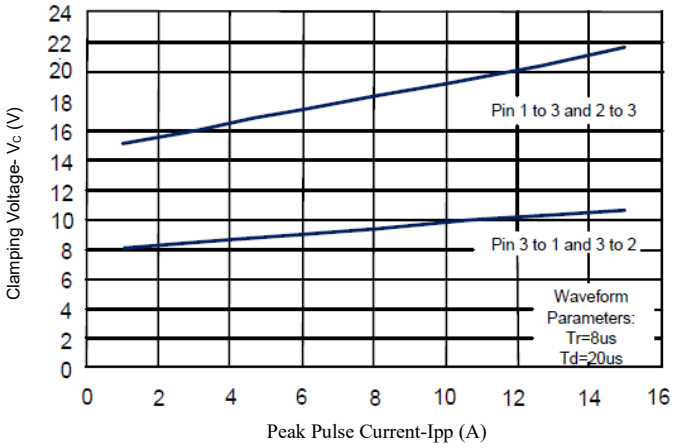
## Typical Characteristics (Ta=25℃, unless otherwise noted)



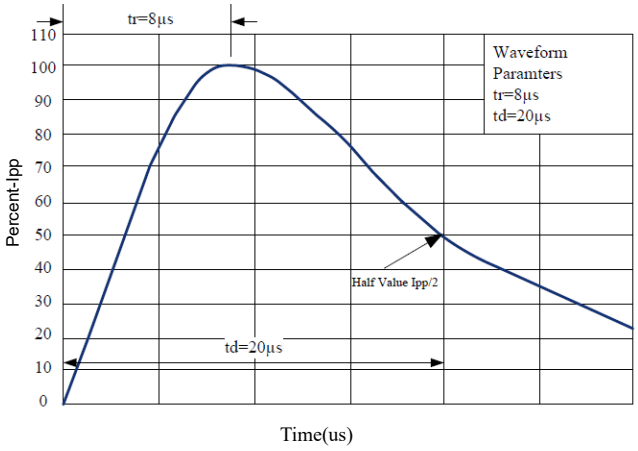

**Peak Pulse Power vs.Pulse Time**



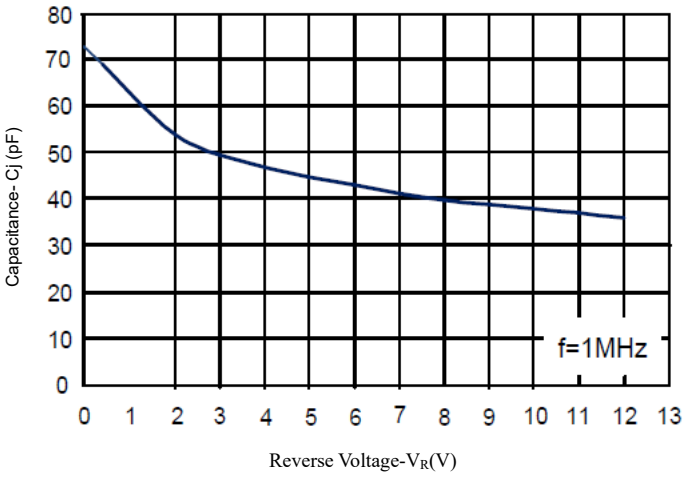

**Power Derating Curve**




**Clamping Voltage vs. Peak Pulse Current**

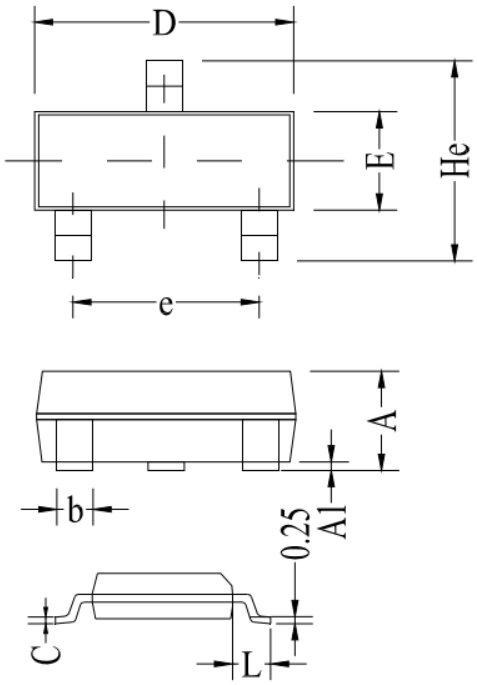



**Pulse Waveform**



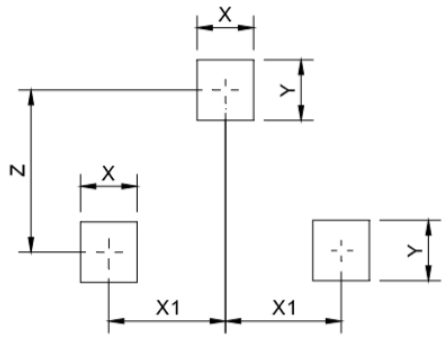

**Capacitabce vs. Reverse Voltage**

## Package Outline Dimensions (SOT23-3）




| Symbol | Millimeter | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.9 | 1.15 | 0.035 | 0.045 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.25 | 0.325 | 0.01 | 0.013 |
| C | 0.22 | 0.25 | 0.009 | 0.01 |
| D | 2.8 | 3.0 | 0.11 | 0.118 |
| e | 1.8 | 1.9 | 0.071 | 0.075 |
| E | 1.2 | 1.4 | 0.047 | 0.055 |
| L | 0.30 | 0.50 | 0.012 | 0.02 |
| He | 2.25 | 2.55 | 0.089 | 0.1 |
| X | 0.8 | | 0.0315 | |
| X1 | 0.95 | | 0.037 | |
| Y | 0.80 | | 0.0315 | |
| Z | 2.02 | | 0.0795 | |

## Recommend Land Pattern (Unit: mm)




Note:
This recommended land pattern is for reference purpose only.

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